ABSTRACT

Charles University

Faculty of Pharmacy in Hradec Králové

Department of Pharmacology and Toxicology

Candidate: Klára Mocová, MSc.

Supervisor: Assoc. Prof. Přemysl Mladěnka, Pharm.D., Ph.D.

Title of Thesis: Determination of the stoichiometry of the copper complexes with 7,8-dihydroxycoumarins

Copper is an important element, which is necessary for right functioning of the organism because of its presence in wide range of enzymes. However, increased level of this element can cause various health complications. Coumarins are natural or synthetic substances, which contain 1,2-benzopyrone in their chemical structure. These compounds are known, among others, by their antioxidant activity, which includes the ability to chelate metals and hence form complexes with them. The stoichiometry of the complex is one of the important characteristics of metal complexes.

The aim of this *in vitro* study was to assess the stoichiometry of 7,8-dihydroxycoumarins complexes with copper. We have been dealing with chelating activity of 7,8-dihydroxy-4-methylcoumarin and 7,8-dihydroxycoumarin with Cu^{+} and Cu^{2+} ions. Direct UV-Vis spectrophotometry was used to measure the complex formation at four physiologically or pathophysiologically relevant pH conditions (4,5; 5,5; 6,8 a 7,5).

Both tested coumarins chelated Cu^{2+} ions in the same stoichiometric ratio (from 2:1 to 1:1) – and only at the three highest pH values. The coumarins were not able to chelate Cu^{2+} ions at pH 4,5 and Cu^{+} at none of the tested pHs.

This thesis has shown, that our tested coumarins can be considered as moderately active Cu^{2+} ions chelators at mildly acid and neutral conditions *in vitro*.